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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/031,476	01/17/2002	Emmanuel Legendre	21.0886	1776

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SCHLUMBERGER OILFIELD SERVICES  
200 GILLINGHAM LANE  
MD 200-9  
SUGAR LAND, TX 77478

EXAMINER

GUTIERREZ, ANTHONY

ART UNIT PAPER NUMBER

2857

DATE MAILED: 03/27/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/031,476

Applicant(s)

LEGENDRE ET AL.

Examiner

Anthony Gutierrez

Art Unit

2862

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 15-40 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 15-40 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 17 January 2002 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

### Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☒ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_.
- 4) ☐ Interview Summary (PTO-413) Paper No(s) \_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_.

**DETAILED ACTION**

***Priority***

1. Acknowledgment is made of applicant's claim for foreign priority based on an application filed in France on 8/5/99. It is noted, however, that applicant has not filed a certified copy of the French application as required by 35 U.S.C. 119(b).

***Specification***

2. The abstract of the disclosure is objected to because it contains multiple uses of the word "said". Correction is required. See MPEP § 608.01 (b). The word "the" would be an appropriate substitute.
3. The disclosure is objected to because of the following informalities: It fails to include subject headings such as "Summary of the Invention" and "Description of the Preferred Embodiments". Appropriate correction is required.

***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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5. Claims 15, 16, 18-22, 24-29, 31-35, and 37-40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Howard Jr. (US Patent 5355088) in view of the cited web page (<http://www-fp.mcs.anl.gov/otc/Guide/OptWeb/continuous/unconstrained/quasi.html>).

As to claims 15, 26-28, 39 and 40 Howard Jr. discloses a method of determining parameters  $R_i$ ,  $R_{x0}$ , and  $d_i$  of formations through which a borehole passes, on the basis of a resistivity log recorded in the borehole by means of a measuring and recording tool (abstract and col. 16, lines 20-55), the method comprising the steps of (i) determining the formation parameters using pseudo-parameters that are homogeneous and that are determined from the formation parameters so as to obtain a model of the formations (col. 12, line 5 to col. 13, line 30 and col. 14, lines 40-50); (ii) calculating the response of the tool to the model; (iii) using a comparison criterion for comparing the calculated response with the recorded log; (iv) performing at least one new iteration if the comparison criterion is not satisfied, and (v) determining the formation parameters from the calculated response (col. 3, line 11-42).

Howard Jr. does not specifically disclose the use of a quasi-Newton parameter inversion.

Howard Jr. does however disclose the approximation of a cost function which is a function of the squares of differences between measured and modelled apparent conductivity (the reciprocal of resistivity) (col. 3, line 11-42). The method requires knowledge of the Hessian matrix of the cost function (col. 18, line 15 to col. 19, lines 5).

The cited web page teaches that Quasi-Newton methods can be used when the Hessian matrix is difficult or time-consuming to evaluate. The Quasi-Newton

methods gradually build an approximate Hessian instead of obtaining a Hessian matrix at a single point (page 1, lines 1-5).

Furthermore, the cited web page teaches that in almost all cases, additional costs of using the Quasi-Newton methods are outweighed by the advantage of superior convergence (page 2, lines 32-34).

It would have therefore been obvious to one of ordinary skill in the art at the time of invention to modify the method of Howard Jr. with a Quasi-Newton parameter inversion in order to provide superior convergence allowing for the determination of more accurate formation parameters.

As to claims 16 and 29, Howard Jr. further discloses determining boundaries between geological beds prior to implementing the method (col. 5, lines 47-62).

As to claims 18 and 31, Howard Jr. further discloses selecting a bed model for each geological bed prior to implementing the method (col. 5, lines 47-62).

As to claims 19 and 32, Howard Jr. further discloses wherein the bed model comprises parameters concerning distance from the borehole axis so as to define radial zones about the axis, and a resistivity parameter within each radial zone defined in this manner (col. 5, lines 47-62).

As to claims 20 and 33, Howard Jr. further discloses selecting observable magnitudes (col. 15, lines 19-63).

As to claims 21 and 34, Howard Jr. further discloses selecting the observable magnitudes includes defining a combination of data items from the log (col. 15, lines 19-63).

As to claims 22 and 35, Howard Jr. further discloses selecting observable magnitudes and giving each observable magnitude a value for each geological bed (col. 15, lines 19-63).

As to claims 24 and 37, Howard Jr. further discloses wherein each observable magnitude is given a value for each geological bed by giving the observable magnitude the value it possesses at a measurement point closest to the middle of the bed (col. 15, lines 19-63).

As to claims 25 and 38, the cited web page further discloses wherein the step of determining parameters from log data by a quasi-Newton method is performed by estimating the Jacobian of the problem by Broyden's method (page 1, lines 31-40).

6. Claims 17, 23, 30 and 36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Howard Jr. (US Patent 5355088) in view of Lacour-Gayet (US Patent 4486836).

As to claims 17 and 30, Howard Jr. discloses determining bed boundaries (col. 5, lines 47-62).

Howard Jr. does not specifically disclose determining the bed boundaries on the basis of points of inflection in log data.

Lacour-Gayet, however, discloses determining bed boundaries on the basis of points of inflection in log data (col. 5, line 44-col. 6, line 40).

It would have been obvious to one of ordinary skill in the art at the time of invention to utilize inflection in log data for the determination of the bed boundaries in the method of Howard Jr. in order to more accurately determine beds that are of

sufficient vertical extent for the method, a benefit taught by Lacour-Gayet (col. 6, lines 15-22).

As to claims 23 and 36, Howard Jr. discloses giving each observable magnitude a value for each geological bed (col. 15, lines 19-63).

Howard Jr. does not specifically disclose wherein the step of giving each observable magnitude a value for each geological bed comprises interpolating, within each layer, values of the observable magnitude as determined within each bed.

Lacour-Gayet, however, discloses comprises interpolating, within each layer, values of the observable magnitude as determined within each bed (col. 12, lines 31-49).

It would have been obvious to one of ordinary skill in the art at the time of invention to modify Howard Jr. in view of Lacour-Gayet, in order to provide correction for the special situation at a boundary of a layered formation, thereby providing a more comprehensive log.

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure: US patents: 5210691, 6047240, 6340509, 6344746, 5870690, 5729451, 4809239.

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Anthony Gutierrez whose telephone number is (703) 305-1973. The examiner can normally be reached on Monday to Friday.

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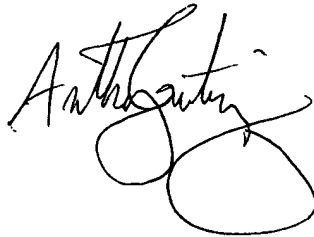
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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edward Lefkowitz can be reached on (703) 305-4816. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9318 for regular communications and (703) 872-9319 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305-4900.

Anthony Gutierrez

3/17/03



**EDWARD LEFKOWITZ**  
**SUPERVISORY PATENT EXAMINER**  
**TECHNOLOGY CENTER 2800**